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ABSTRACT

OBJECTIVE: The multifaceted nature of health care delivery has led to the need to incorporate strategies that will help to enhance performance and maintain the quality of the health care environment. However, even though dedicated health care staffs contribute to patients' satisfaction of health care delivery, the health care environment must ensure the safety and well-being of patients. Like most developing countries, many public hospitals in Ghana are faced with challenges in the area of health care healing environment. Therefore, this article investigates the mediating effect of health care healing environment between health care core business and patients' satisfaction.

METHOD: This is a cross-sectional study involving adult patients of Komfo Anokye Teaching Hospital, Tamale Teaching Hospital, and Cape Coast Teaching Hospital in Ghana. A questionnaire survey based on the 'A Staff and Patient Environment Calibration Toolkit (ASPECT)' dimensions and health care core service dimensions was used to collect data from 622 patients. SmartPLS was used to analyse the data collected.

RESULTS: The findings of the study show that the quality of health care healing environment mediates the relationship between patients' satisfaction and all of the constructs under the core health care delivery.

CONCLUSION: Stakeholders of the Ghanaian health care sector should take initiatives to constantly improve the quality of health care healing environment as it has an influence on patient satisfaction of the overall core health care delivery.

KEYWORDS: Health care healing environment, health care delivery, patient satisfaction, mediating effect, Ghana

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Introduction

> Health-care settings are environments with a high prevalence of infectious disease agents. Patients, staff, carers and neighbours of the health-care setting face unacceptable risks of infection if environmental health is inadequate. The health-care setting might even become the epicentre of outbreaks of certain diseases. Thus, managing the various and interdependent aspects of environmental health at the level of the health-care setting is very vital.[1]

However, health care delivery is challenged by a wide range of safety problems. The fact still remains that patients go through challenges on a daily basis worldwide in the course of receiving health care. This disturbing truth must be acknowledged and necessary actions taken to correct the problems that are contributing to unsafe health care.[2] These challenges include the development of the necessary conducive environment to ensure patient satisfaction. Patient satisfaction with health care healing environment depends on a patient's overall evaluation of the health care experience.

Thus, to ensure patient satisfaction from the point of view of environmental health,

> Maintaining a healthy environment is central to increasing quality of life and years of healthy life. Poor environmental quality has its greatest impact on people whose health status is already at risk. Therefore, environmental health must address the societal and environmental factors that increase the likelihood of exposure and disease.[3]

Thus, based on current economic environment and an increased focus on patient satisfaction, failure to provide a conducive health care healing environment to aid patient recovery makes even less sense than before. There is, therefore, the need to identify opportunities to improve efficiency, comfort, health, and safety of patients and the environment.[4-6] Thus, it is vital to determine patients' assessment of health care healing environment of Ghanaian teaching hospitals and identify whether it impacts positively on patient satisfaction of core health care delivery.

Health Care Delivery in Ghana

The Ghanaian health care system is challenged with the difficult duty of improving and ensuring the health and well-being of all Ghanaian.[7] The Ghana Health Service[8] is mandated 'to

provide and prudently manage comprehensive and accessible quality health services in accordance with approved national policies'. Public health care services in Ghana are performed through a hierarchy of hospitals, health centres, maternity homes, clinics, and Community-Based Health Planning and Services (CHPS) strategy.[9]

Presently, Ghana has 4 teaching hospitals, with a fifth one set to be operational this year:

> Teaching hospitals are centres of excellence and complex health care. Stakeholders in the governance of teaching hospitals include the Ministry of Health, the Ministry of Education, and university and political influences in the community. They are mostly referral centres which provide solutions to healthcare challenges through research and training of health professional at both basic and postgraduate levels (pre-service and in-service). Teaching hospitals are supposed to set high-quality clinical standards and treatment protocols, and should provide the best quality of care in the country.[10]

The United Nation's Sustainable Development Goals (SDG 3) enjoin all nations to ensure healthy lives and promote well-being for all at all ages. To meet this objective, the Ghana Health Service has resolved to continuously improve the health and well-being of Ghanaians through the development of a better coordinated health system that places patients and communities at the centre of quality care (SDG 3). The whole vision is to create a health system that places the client at the centre of health care. As part of this integrated national strategy for improving the quality of care and patient safety, the Ghana Health Service hopes to continuously improve health outcomes through the development of a coordinated health care quality system that improves client experience by being responsive to the health needs and aspirations of the patients.[10]

Such goals can be achieved if care is taken to create a hospital environment that is conducive and safe to both the patients and the health care workers. It will permit health workers to constantly deliver safe and high-quality care to improve patient safety and so ensure patient satisfaction. However, most studies conclusively indicate that the health care service quality in Ghana does not measure up to the expectation of health care users.[7,8,11] According to Atinga et al,[12] patients in Ghana are so much concerned about health care environmental tidiness, cleanliness, and privacy during consultation with doctors and nurses. Thus, it is important to determine the mediating effect health care healing environment has on patients' satisfaction of core health care delivery in Ghana.

Quality of Health Care Healing Environment

> *A healing environment refer to a physical setting and organisational culture that is psychologically supportive, with the overall goal of reducing stress in order to help patients and families cope with illness, hospitalisation and, sometimes, bereavement. It provides opportunities for patients to exercise control, to express themselves, and to partner with care givers in learning about their illnesses and treatment options ...*[4]

'Humans interact with the environment constantly. These interactions affect quality of life, years of healthy life lived, and health disparities'.[13] Consequently, the growing demand for safety, security, competence, and physical and psychological comfort of patients has brought about the need for a healing environment in health care facilities.[14,15] A healing environment is psychologically supportive for the welfare of patients to deal with the stress associated with illness.[3,16] As far back as the mid-19th century, Florence Nightingale saw the need to create a health care environment that aid patients' recovery. According to Nightingale,[17,18] 'patients would recover more quickly if they were cared for in an environment that had natural light, ventilation, cleanliness and basic sanitation'. According to World Health Organisation,[2] 'good health and well-being require a clean and harmonious environment in which physical, physiological, social and aesthetic factors are all given their due importance. The environment should be regarded as a resource for improving living conditions and increasing well-being'. This is what the concept of environmental health also seeks to address. Environmental health entails the prevention or control of disease, injury, and disability associated with the interactions between people and their environment.[3] Based on the environmental health concept, although it is important to create a healing environment for patient-centred care, a healing environment is much more than the aesthetics of a space. There is the need to understand and have a more integrated assessment of the physical dimensions that help in the physical, mental, and emotional well-being of health care facility users; whether they are patients, their family members, or health care workers.[5,6,14,19]

'The environment affects our health in a variety of ways. The interaction between human health and the environment has been extensively studied and environmental risks have been proven to significantly impact human health'.[20] For the purpose of this study, health care healing environment is discussed based on some of the dimensions of 'A Staff and Patient Environment Calibration Toolkit (ASPECT)' used to assess the quality of health care healing environment. These include privacy, compatibility, and dignity (patients' privacy and dignity must be maintained while they are at health care facilities); views, nature, and outdoor (the degree to which patients can see out of and around the building); comfort and control (hospital layout should minimise unwanted noise in patient areas and patients should also be able to easily control the internal temperature and lighting); legibility of the place (building layouts should be clear and easy to understand, so patients can easily find their way with ease); and interior appearance (patients' spaces should feel homely, the interior spaces should feel light and airy, and have a variety of colours, look clean, tidy, and cared for).[5,15,16,21] All these factors influence patients' satisfaction with overall health care delivery.

Patient Satisfaction with Core Health Care Delivery

The need to achieve patients' satisfaction and maintain patients' loyalty has led to the need for health care providers to continually improve the quality of health care delivery (QHD) to make it more patient oriented.[22] Thus, health care institutions need to understand the underlying forces that lead to patient satisfaction of the

Table 1. Health care core service dimensions for this research.

Health care core service dimensions
The effectiveness of health centre services in treating patients
Doctors' competence in treating disease
Nurses' competence in treating disease
The quality of health care personnel
Employees' hospitality and courtesy towards patients
Doctors'/nurses' willingness to listen to patients' problems
Doctors'/nurses' professionalism in examining patients
The adequacy of health care resources
Sufficiency of medical equipment
Sufficiency of available room
Sufficiency of personnel (doctors, nurses, and administrative staff)
The quality of administrative process
Waiting time for patients to receive treatment
The ease of registration procedures
The speed of registration process
The ease of payment procedures
Overall waiting time

QHD.[23] Over the years, different researchers have evaluated patient satisfaction of core health care delivery service based on different service quality dimensions. Akter et al[24] based their research on platform quality, interaction quality, and outcome quality, that is, system reliability, system efficiency, system availability, system privacy, responsiveness, assurance, empathy, functional benefit, and emotional benefit. Chahal and Kumari[25] used physical environment quality, interaction quality, and outcome quality (ambient condition, social factor, tangibles, attitude and behaviour, expertise, process quality, waiting time, patient satisfaction, and loyalty). Atinga et al[11] assessed it based on communication, provider-patient relationship, environment, and waiting time. Abuosi and Atinga[26] evaluated it using tangibility, reliability, responsiveness, assurance, empathy. Sumaedi et al[27] used QHD, quality of health care personnel (QHP), adequacy of health care resources (AHR), quality of administrative process (QAP), perceived sacrifice, perceived value, and image. Finally, Rakhmawati et al[28] assessed it using the QHD, the QHP, the AHR, and the QAP.

For the purpose of this study, it was determined that most of these dimensions different researchers employed to assess patient satisfaction with core health care delivery in different countries can be appropriately grouped into 4 main categories proposed by Rakhmawati et al.[28] Therefore, taking the case in Ghana into consideration, the dimensions used for this study include the QHD, the QHP, the AHR, and the QAP. These were further broken down into their essential questions as shown in Table 1.

Hypothesis Development

Based on the literature review, the hypotheses were developed based on the transmittal approach. The transmittal approach requires only a single hypothesis stating that the mediator mediates the relationship between the independent and dependent construct.[29]

H1: *Health care healing environment mediates the relationship between the quality of health care delivery and patient satisfaction.*

H2: Health care healing environment mediates the relationship between the quality of health care personnel and patient satisfaction.

H3: Health care healing environment mediates the relationship between the adequacy of health care resources and patient satisfaction.

H4: Health care healing environment mediates the relationship between the quality of administrative process and patient satisfaction.

Based on the research hypothesis established, the research framework was developed to test the hypothesis research as shown in Figure 1.

Methodology

This is a cross-sectional study involving adult patient visiting a tertiary care setting. This study was conducted at the Physician outpatient department (OPD) and Polyclinic of Komfo Anokye Teaching Hospital, Tamale Teaching Hospital, and Cape Coast Teaching Hospital, all in Ghana from September to December 2017. The quality of health care healing environment was assessed using some of the established dimensions of 'ASPECT'. The ASPECT is a tool for assessing the quality of the designed environment in health care buildings.[15] It was chosen as it is a valid and reliable tool designed for evaluation of health care environment based on the database of more than 600 researches and have been applied and tested by different authors.[6,14-16,19,21] The dimensions used to evaluate the health care healing environment for this study include privacy, compatibility and dignity, views, nature and outdoor, comfort and control, legibility of the place, and interior appearance. Health care core service dimensions were used to assess the core health care delivery.

The ASPECT dimensions of '*Facilities* and *Staff* were omitted because based on the pilot study, the factor loading matrix of these 2 dimensions did not pass the 0.5 threshold and thus were found to be insignificant predictors of the mediating effect of health care healing environment on core health care delivery and patient satisfaction in Ghana. According to Field,[30] there is the need to ensure a fairly correlated data sample adequacy and assumptions testing in performing factor analysis. Thus, the correlation matrix used to examine the configuration of the relationship between the items to ensure variable significant values for the *facilities* and *staff* dimensions was less than 0.5.

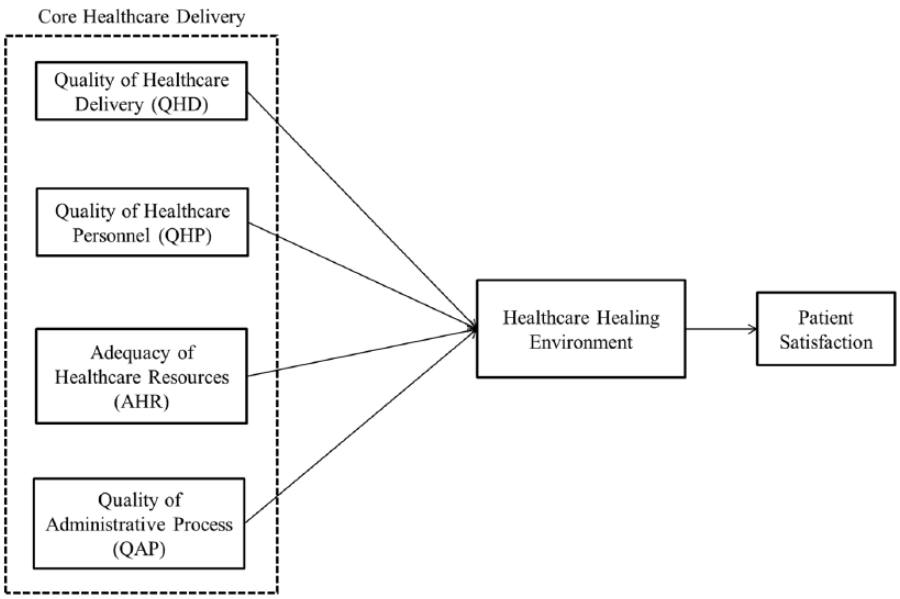

Figure 1. Research framework.

Only the patients of these surveyed teaching hospitals were chosen to be the respondents of this study because they are the direct customers of the health care institutions who are directly impacted by the relationship between health care healing environment and core health care business. A pilot study involving 50 patients was initially conducted, and the results informed the final questionnaire of the study. To guard against sampling bias, the patients were grouped under clusters such as the records section, consultancy services, pharmacy, maternal and child health, laboratory, physiotherapy, and ENT. Convenience sampling was then be used to select the individual patients.

> Convenience sampling is a type of nonprobability sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study.[31]

Convenient sampling method was used because patients were chosen based on their availability at a given time and their willingness to participate in this study. This is because researchers could not get a list of all patients who patronise the health care organisations, which the researcher would need to use as the basis of a probability sampling technique. Thus, irrespective of the perceived disadvantages of possible sampling error and data gathering bias, convenience sampling was deemed the best channel to select the target respondents of the study.

Questionnaires (see appendix 1) were administered to 660 patients, 18 years and above waiting to see their physicians at the 3 hospitals if they gave consent. Enrolment continued till the sample size was obtained. In all, 622 questionnaires were valid for the analysis. The data collected were edited, sorted, and coded using Microsoft Excel and Statistical Package for Social Scientists (SPSS). Structural equation model (SEM)–partial least square (PLS) analysis SmartPLS[32] was the main tool used for the data analysis. SmartPLS is a SEM software created to test models. It affords the chance to draw the path model between variables and to define the indicators to the variables.[33]

Respondents' Profile

According to Table 2, Komfo Anokye Teaching Hospital had the highest number of respondents, that is, 34.1%; 33.4% are patients of Cape Coast Teaching Hospital and the remaining 32.5% are patients of Tamale Teaching Hospital, all in Ghana. About 51.1% of the study respondents were men; and most of them are between the ages of 21 and 50 years. In terms of educational level, a greater majority (27.7%) of the respondents are university degree holders. About 18.0% are polytechnic degree holders, 23.7% are secondary school certificate holders, while illiterates are about 9.8%. Most of the respondents have been patients of the particular teaching hospitals for 5 years or less as 65.1% fall within this category. Only 7.8% have been patients of the particular hospital for more than 20 years; 31.5% of the respondents are self-employed, while 24.8% are either civil or public servants. In addition, 18.8% are students and 8.8% are unemployed.

Data Analysis

First, the common method variance was examined because Podsakoff et al[34] opined that when data are gathered from the same person through self-reported questionnaires and both the predictor and criterion variables are obtained the same way, there is the need to assess the common method variance of the data. In addition to this, the same source bias or general method variance was also evaluated using Harman single factor test. Evidence of a common method bias occurs when primary constructs intercorrelations using the correlation matrix have correlations considerably larger (>0.90).[35] SPSS was used to check factor analysis and the results showed that there was no serious issue with method bias in this study. The intercorrelations also did not show any

Table 2. Respondents' profile.

VARIABLES	CATEGORY	FREQUENCY	PERCENTAGE (%)
Respondents distribution per teaching hospital	Komfo Anokye	212	34.1
	Cape Coast	208	33.4
	Tamale	202	32.5
Sex	Male	318	51.1
	Female	304	48.9
Age (years)	18-20	34	5.5
	21-30	167	26.8
	31-40	171	27.5
	41-50	112	18.0
	51-60	68	10.9
	61-70	52	8.4
	Above 70	18	2.9
Educational level	Illiterate	61	9.8
	Junior high	70	11.3
	Senior high	146	23.5
	Polytechnic	112	18.0
	University	172	27.7
	Post graduate	27	4.3
	Other	34	5.5
Profession	Civil/public servant	154	24.8
	Self-employed	196	31.5
	Student	117	18.8
	Artisan	35	5.6
	Unemployed	55	8.8
	Other	65	10.5
Period of being a patient of the hospital (years)	0-5	405	65.1
	6-10	112	18.0
	11-15	42	6.8
	16-20	14	2.3
	More than 20	49	7.8

value above 0.9. Therefore, these tests demonstrate that there was no problem with method bias in the study. All the VIF values in Appendix 4, which shows how the variance of regression coefficient of one variable is influenced by the other predictor variables, were found to be lower than the threshold value of 10. Thus, there was no challenge of unstable indicator weights that can render the regression coefficient unreliable.[32,33,34] The results of the normality test as shown in appendix 5 indicate the skewness (how symmetrically distributed a data is, whether positive or negative) and kurtosis (how high a dataset is distributed around the mean) were all within the range of -2 to +2 as suggested by.[33,40] This shows that the data was normally distributed.

Partial least squares analysis using the SmartPLS 3.2.7 software[32] was used to analyse the research model. Anderson and Gerbing[36] recommended a 2-stage analytical procedure for the measurement model (validity and reliability of the measures). Thus, these were confirmed. In addition, the structural model was also examined as Hair et al[33] recommend testing the

Table 3. Measurement model.

CONSTRUCT	ITEMS	LOADING	AVE	CR
Adequacy of health care resources	AHR1	0.819	0.556	0.787
	AHR2	0.785		
	AHR3	0.617		
Quality of health care delivery	QHD1	0.873	0.760	0.864
	QHD2	0.871		
Quality of health care personnel	QHP1	0.855	0.708	0.829
	QHP2	0.828		
Quality of administrative process	QAP1	0.713	0.585	0.875
	QAP2	0.788		
	QAP3	0.831		
	QAP4	0.740		
	QAP5	0.745		
Quality of healing environment	VNO2	0.714	0.480	0.826
	VNO4	0.686		
	VNO5	0.599		
	LOP2	0.621		
	IAP2	0.643		
	IAP4	0.717		
Patient satisfaction	CHD1	0.706	0.504	0.877
	CHD3	0.685		
	CHD4	0.675		
	GSA2	0.701		
	GSA4	0.709		
	GSA5	0.739		
	GSA6	0.752		

Abbreviations: AVE, average variance extracted; CR, composite reliability.

hypothesised relationship of the structural model. This was assessed by bootstrapping method (5000 samples) to check the significance of the path coefficients and the loadings.[33]

Measurement Model

Convergent validity and discriminant validity were used to assess the validity of the measurement model. The convergent validity of the measurement, according to Gholami et al,[37] is proven by examining the loadings, average variance extracted (AVE), and the composite reliability. The loadings were all higher than 0.7. In all cases, the composite reliabilities were all higher than 0.7 and the AVE was also higher than 0.5 (see Table 3).

The Fornell and Larcker[38] criterion was used to assess the discriminant validity of the measures. That is, the extent to which items differentiate among constructs or measure distinct concepts. Its correlations between constructs and the square root of the AVE for that construct are compared and the rule of thumb is that all the diagonal values should be greater than the corresponding row and column values. According to Table 4, the study results achieved this, and this indicates that the measures were discriminant.

According to Henseler et al,[39] in addition to the Fornell-Larcker[38]criterion, to very reliably detect the absence of discriminant validity, the heterotrait-monotrait ratio of correlations (HTMT), which is a multitrait-multimethod matrix, should also be assessed. Thus, this method was also used to test the discriminant validity. According to Kline,[40] to ensure discriminant validity, the HTMT value should not be greater than 0.85. Table 5 shows that all the values passed the HTMT 0.85. Thus,

Table 4. Discriminant validity: Fornell-Larcker criterion.

	AHR	HHE	PS	QAP	QHD	QHP
AHR	**0.745**					
HHE	0.470	**0.665**				
PS	0.383	0.612	**0.710**			
QAP	0.497	0.444	0.319	**0.765**		
QHD	0.405	0.438	0.470	0.240	**0.872**	
QHP	0.388	0.457	0.505	0.320	0.535	**0.842**

Abbreviations: AHR, adequacy of health care resources; HHE, health care healing environment; PS, patient satisfaction; QAP, quality of administrative process; QHD, quality of health care delivery; QHP, quality of health care personnel.
Values on the diagonal (in boldface) are square root of the average variance extracted, while the off-diagonals are correlations.

Table 5. Discriminant validity: Heterotriat-Monotrait ratio of correlations (HTMT).

	AHR	HHE	PS	QAP	QHD	QHP
AHR						
HHE	0.678					
PS	0.521	0.767				
QAP	0.700	0.548	0.369			
QHD	0.614	0.612	0.623	0.311		
QHP	0.641	0.687	0.721	0.451	0.843	

Abbreviations: AHR, adequacy of health care resources; HHE, health care healing environment; PS, patient satisfaction; QAP, quality of administrative process; QHD, quality of health care delivery; QHP, quality of health care personnel.

using both the Fornell and Larcker[38] criterion and the HTMT, the results show that discriminant validity was achieved.

Hypothesis Testing

Bootstrapping method using subsamples of 5000 cases was created to assess the model for each subsample.[33] This was used to generate results for all the path relationship in the model. All the path relationships were found to be significant at 95% confidence interval. According to appendix 2, (QHD → Healing Environment, ß = 0.194, $P < .05$; QHP → Healing Environment, ß = 0.201, $P < .05$; AHR → Healing Environment, ß = 0.197, $P < .05$; QAP → Healing Environment, ß = 0.235, $P < .75$, and Healing Environment → Patient Satisfaction, ß = 0.612, $P < .05$). The results of the structural model is as portrayed in appendix 3.

The fundamental consideration of mediation analysis is that there is a significant relationship between the independent variable and outcome through the mediator.[41] This can be assessed by bootstrapping the sampling distribution of the indirect effect. A statistically significant indirect effect (t value > 1.96, 2-tailed, $P < .05$) should be taken as an evidence for mediation.[41] Thus, the hypotheses were tested to confirm whether there is a mediation effect between the quality of core health care delivery (independent variable) and patients' satisfaction (the outcome/dependent variable) through health care healing environment (the mediator). The entire 4 hypotheses were supported. This means that the mediator has a mediating effect between the independent and dependent constructs of the study. The result of the bootstrapping is presented in Table 6.

In addition to establishing the decisions for the hypotheses, the study also assessed the coefficient of determination (R^2), the effect size (f^2), and the cross-validated redundancy (Q^2) of exogenous constructs on endogenous constructs. According to Table 7, the values for coefficient of determination (R^2) of 0.375 and 0.373 indicate that the exogenous variables in this study explain 37.3% of variances in Health Care Healing Environment and 37.5% of variances in patient satisfaction. This demonstrates a sign of significant explanatory capacity.[42]

Because the emphasis of PLS-SEM is on prediction, there is the need to determine the Q^2 using blindfolding procedure.[43] According to Hair et al,[33] if the Q^2 value is larger than 0, the model has predictive relevance for a certain endogenous construct and otherwise if the value is less than 0. According to Table 6, the Q^2 values were determined as 0.153 for Health Care Healing Environment and 0.175 for Patient satisfaction.

These figures arrived at were greater than 0 and therefore indicate that all exogenous variables have predictive relevance over the endogenous variable.[43,44] The f^2 values indicate the impact of each exogenous construct on endogenous constructs. The study shows that the effect of QAP on health care healing environment ($f^2 = 0.065$) is greater than that of AHR ($f^2 = 0.040$), QHP ($f^2 = 0.043$), and QHD ($f^2 = 0.040$). Obviously, this means that QAP has more effect on health care patients' satisfaction in Ghana.

Discussion, Implication, and Limitation

From the point of view of environmental health, the environment within the hospital is very important if the well-being of health care users is to be supported. Hospitals are typical of multifaceted environments in which various facets including patients, staff, equipment, services, and information are interfaced. Thus, maintaining a safe environment shows the capability of the health care institution to ensure patient safety and well-being.[45] Thus, the findings of the study confirm that the health care healing environment compliment the core health care delivery to ensure patient satisfaction. The findings of the study add to the body of knowledge in health care facilities management literature.

The specific indirect effect of the bootstrapping shows that the different constructs that all contribute to core health care delivery (QHD, QHP, AHR, and the QAP) all contribute differently to patient satisfaction. The study results showed that *QAP* predicts patients' satisfaction better, as its mediation effect is stronger than that of *AHR*, *QHD*, and *QHP*.

The study supports the fact that a healing environment is vital to patient-centred care. However, while improving the physical environment is important, a healing environment has

Table 6. Hypothesis testing (mediating effect).

HYPOTHESIS		DIRECT EFFECT (SS)	STANDARD ERROR	*T* VALUE	*P* VALUE	DECISION
H1	Quality of health care delivery → health care healing environment → patient satisfaction	0.119	0.031	3.813**	.000	Supported
H2	Quality of health care personnel → health care healing environment → patient satisfaction	0.123	0.029	4.006**	.000	Supported
H3	Adequacy of health care resources → health care healing environment → patient satisfaction	0.120	0.028	4.289**	.000	Supported
H4	Quality of administrative process → health care healing environment → patient satisfaction	0.144	0.031	5.019**	.000	Supported

Table 7. Determination of coefficient (R^2), effect size (f^2), and predictive relevance (Q^2).

	R^2	Q^2	F^2	SIZE OF EFFECT
Health care healing environment	0.373	0.153	0.600	Large
Patient satisfaction	0.375	0.175		
Quality of health care delivery (QHD)			0.040	Small to medium
Quality of health care personnel (QHP)			0.043	Small to medium
Adequacy of health care resources (AHR)			0.040	Small to medium
Quality of administrative process (QAP)			0.065	Small to medium

much more facets than just the aesthetics of a space. In the building of a health care facility that respond positively to indoor air environment, there is the need to understand and have a more integrated assessment of the physical dimensions that help in the physical, mental, and emotional well-being of health care facility users; whether they are patients, their family members, or health care workers.[14,16,19]

Although the paths of the hypothesis were supported, the results indicate that the effect sizes are small to medium. Therefore, it is important that health care providers highly increase the effect that the healing environment has on patient satisfaction of core health care delivery by drastically improving the quality of the dimensions of health care healing environment and the overall core health care delivery. In so doing, the health care environment will not only lead to patient satisfaction but also lead to enhanced performance, better worker satisfaction, and patient care.[19,46]

The study findings also illustrate that once there is an improvement in the quality of the health care healing environment, it will have a positive significant effect on patient satisfaction of the core health care delivery, and in so doing, the mediating effect of the healing environment will increase to ensure patient satisfaction which leads to patients' loyalty. Based on the findings of the study, it is recommended that, it is important the public hospitals improve their healing environment in addition to delivering quality health care service to ensure that patient satisfaction and loyalty are both sustained and enhanced.

The implication of this study is that if the hospital management team wants to further strengthen the mediating effect of health care healing environment in guaranteeing patients' satisfaction of the core health care delivery, then they should create a healing environment that is psychologically supportive for the welfare of patients to deal with the stress associated with illness. These will guarantee the safety, security, and physical and psychological comfort of patients.[5,16,19]

Like other studies, this study has its limitation; the study was conducted at the teaching hospitals where services and facilities are comparatively better than the district and regional hospital. It is therefore recommended that in future, the same study be conducted in some district and regional hospitals to determine whether the study results will be the same or different.

Second, the study employed a cross-sectional strategy which does not assess patients' perception over a period of time. It is recommended that though difficult to achieve, a longitudinal study can be piloted to provide more insight.

Although the data were collected from only one country (Ghana), the ability to generalise the results may be a challenge. It is unclear whether the findings may have the same implications for the mediating influence of health care healing environment on patients' satisfaction and core health care delivery in other context as patients' perceptions maybe different in other countries.

Conclusions

The findings of the study can contribute to stakeholders of the Ghanaian health care sector's quest to achieve the SDG 3. It is an irrefutable fact that stakeholders of health care delivery all over the

world appreciate the importance of health care healing environment in contributing to patients' satisfaction of core health care delivery. This study reinforces the fact that though dedicated health care staffs contribute to patients' satisfaction of core health care delivery, the quality of the health care healing environment must ensure the safety and well-being of patients. This study is important in that it confirms that the patients' overall assessment of satisfaction with the QHD can be influenced by the quality of the health care healing environment. It also goes to reinforce the assertion that a health care environment must be psychologically supportive for the welfare of patients.[16,19] It is based on this premise that stakeholders of Ghanaian health care delivery should undertake initiatives to continually improve the quality of health care healing environment as it is one of the key factors that contribute to the overall patient satisfaction with core health care delivery.

Although every health care institution seeks to provide a health care healing environment that will impact positively on patients' overall health care experience, this has been met with challenges because the truth is that although health care healing environment varies from hospital to hospital, most hospitals try to create what they believe will lead to patient satisfaction without engaging the patients who are their customers to find out what they really need. Thus, with this study being based on patients' perspective, it is believed that the results of this study will benefit 3 key stakeholders. These are the health care staff, the hospital management team, and the patients of health facility. The hospital management will be able to improve their health care healing environment as it has a positive significant influence on both patients' overall health care experience and staff attitude to work.[5,6,14,19] The health care staff will benefit because there is proof that the quality of the health care healing environment also impact positively on the staff by decreasing stress and increasing effectiveness and improving their work performance and productivity.[5,6,14,19] Furthermore, the patients will also benefit because apart from the dedication of the health care personnel, the physical structures and hospital environment must also ensure the safety and well-being of patients.[5,6,19]

In conclusion, this empirical validation offers more insight on the influence of health care healing environment on patients' satisfaction of core health care business. To the best of the researcher's knowledge, this study is one of first to use the ASPECT dimensions in examining health care healing environment in the Ghanaian health care sector. The study result has confirmed the strength of the ASPECT dimensions in predicting patients' satisfaction. This study will contribute to knowledge in health care in general and that of a developing African country in particular.

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Author Contributions

Development of Ideas: OA, WWC, AHM.
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Appendix 1. Questionnaire.

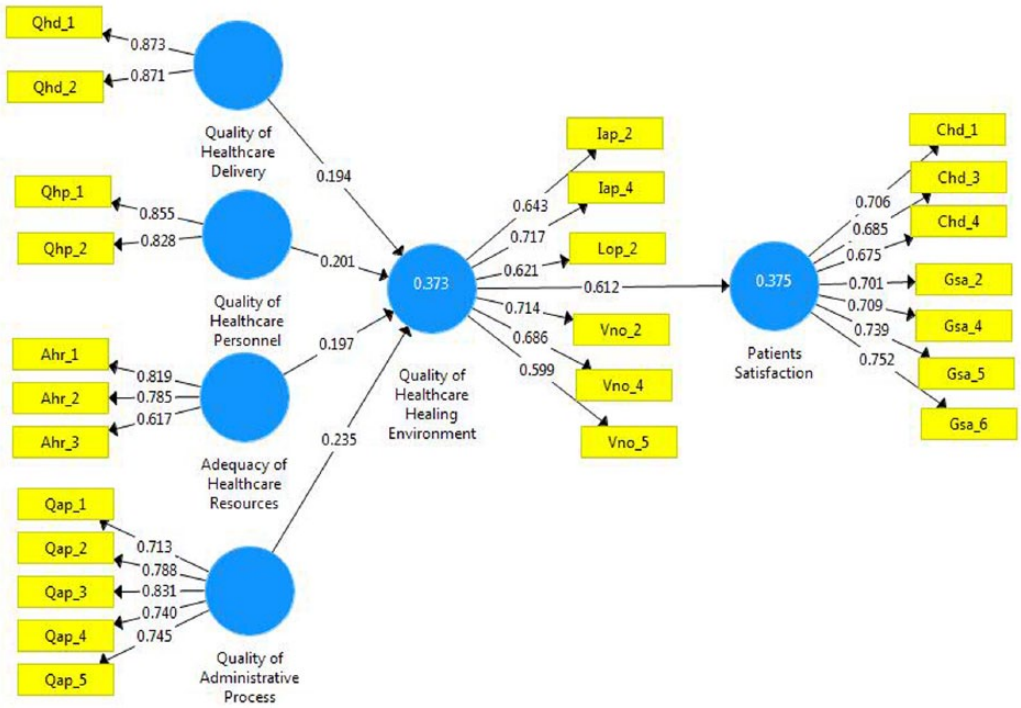
QUALITY OF CORE HEALTH CARE **BUSINESS**
Health Care Core Service delivery affects human health and well-being. This part of the questionnaire provides some factors that have been identified to contribute to the quality of health care core service. Using a 5-point scoring scale to express your level of agreement with the statement, please tick (√) where appropriate in the box that best explains your opinion.
1 = Poor, 2 = Satisfactory, 3 = Good, 4 = Very good, or 5 = Excellent

NO.	STATEMENT	DEGREE				
		1	2	3	4	5
Quality of health care delivery (QHD)						
1	Effectiveness of health care services in treating patients					
2	Doctors' competence in treating patients					
3	Nurses' competence in treating patients					
Quality of health care personnel (QHP)						
1	Employees' hospitality and courtesy towards patients					
2	Doctors'/nurses' willingness to listen to patients' problems					
3	Doctors'/nurses' professionalism in examining patients					
Adequacy of health care resources (AHR)						
1	Sufficiency of medical equipment					
2	Sufficiency of rooms available					
3	Sufficiency of health care personnel (doctors, nurses, and administrative staff)					
Quality of administrative process (QAP)						
1	Waiting time for patients to receive treatment					
2	The ease of registration procedures					
3	The speed of registration process					
4	The ease of payment procedures					
5	Overall waiting time					

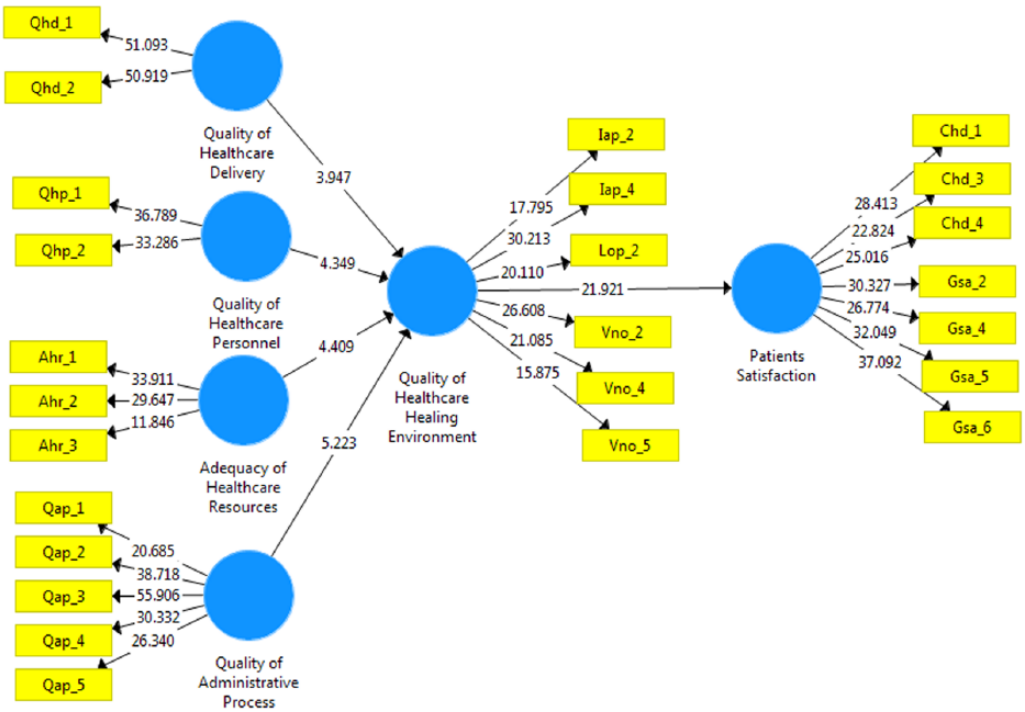
Appendix 1. (Continued)

QUALITY OF HEALTH CARE HEALING ENVIRONMENT
The physical characteristics of the health care healing environment affect patients' health and well-being. This part of the questionnaire provides some factors that have been identified to contribute to health care healing environment. Using a 5-point scoring scale to express your level of agreement with the statement, please tick (√) where appropriate in the box that best explains your opinion.
1 = Virtually no agreement, 2 = Little agreement, 3 = Neither agree nor disagree, 4 = Strong agreement, or 5 = Virtually complete agreement

NO.	QUALITY OF HEALTH CARE HEALING ENVIRONMENT	DEGREE				
		1	2	3	4	5
Privacy, Company, and Dignity (PCD)						
1	Patients can choose to have visual privacy					
2	Patients can have a private conversation					
3	Patients have places where they can be with others					
4	Toilets/bathrooms are located logically, conveniently, and discretely					
Views, Nature, and Outdoors (VNO)						
1	The view outside is interesting and calming					
2	Patients are not restricted in their movement					
3	Doctors'/nurses' professionalism in examining patients					
4	Patients can easily see plants, vegetation, and nature					
Comfort and Control (CAC)						
1	There is a variety of artificial lighting patterns appropriate for day and night					
2	Patients can easily control the artificial lighting					
3	Patients can easily control the temperature					
4	Patients can easily open the windows/doors					
5	The design layout minimises unwanted noise in patient areas					
Legibility of Place (LOP)						
1	It is easy to understand the way the building is laid out					
2	The entrance and way out of the building is obvious					
3	It is obvious where to go to find a member of staff					
Interior Appearance (IAP)						
1	Interior feels homely and airy					
2	Interior has a variety of colours, texture, and views					
3	Interior looks clean and tidy					
4	Patients can have and display personal items in their own space					
5	Floors are covered with suitable material					



Appendix 2 Measurement model results of the mediating effect of health care healing environment between patients' satisfaction and core health care business in Ghanaian teaching hospitals.



Appendix 3 Structural model results of the mediating effect of health care healing environment between patients' satisfaction and core health care business in Ghanaian teaching hospitals.

Appendix 4. Nonlinearity assessment of the independent variables
Outer VIF values.

	VIF
Ahr_1	1.255
Ahr_2	1.270
Ahr_3	1.138
Chd_1	1.641
Chd_3	1.595
Chd_4	1.542
Gsa_2	1.482
Gsa_4	1.722
Gsa_5	1.685
Gsa_6	1.736
Iap_2	1.318
Iap_4	1.431
Lop_2	1.279
Qap_1	1.600
Qap_2	1.668
Qap_3	1.965
Qap_4	1.447
Qap_5	1.706
Qhd_1	1.372
Qhd_2	1.372
Qhp_1	1.211
Qhp_2	1.211
Vno_2	1.501
Vno_4	1.492
Vno_5	1.228

Abbreviation: VIF, variance inflation factor.

Inner VIF values.

	QUALITY OF HEALTH CARE HEALING ENVIRONMENT	ADEQUACY OF HEALTH CARE RESOURCES	PATIENT SATISFACTION	QUALITY OF ADMINISTRATIVE PROCESS	QUALITY OF HEALTH CARE DELIVERY	QUALITY OF HEALTH CARE PERSONNEL
Quality of health care healing environment			1.000			
Adequacy of health care resources	1.529					
Patient satisfaction						
Quality of administrative process	1.364					
Quality of health care delivery	1.499					
Quality of health care personnel	1.510					

Abbreviation: VIF, variance inflation factor.

Appendix 5. Normality test.

CONSTRUCT	ITEMS	MEAN	STANDARD DEVIATION	SKEWNESS	KURTOSIS
Quality of health care delivery	QHD1	2.908	0.965	0.453	−0.171
	QHD2	3.484	0.894	−0.202	−0.218
Quality of health care personnel	QHP1	2.952	0.943	0.281	−0.356
	QHP2	3.317	0.914	0.024	−0.233
Adequacy of health care resources	AHR1	2.857	0.973	0.185	−0.469
	AHR2	2.884	0.925	0.342	−0.276
	AHR3	2.995	0.934	0.010	−0.379
Quality of administrative process	QAP1	2.283	0.982	0.501	−0.194
	QAP2	2.296	0.942	0.503	−0.015
	QAP3	2.375	0.974	0.439	−0.124
	QAP4	2.675	0.941	−0.009	−0.400
	QAP5	2.397	0.976	0.218	−0.598
Quality of healing environment	VNO1	3.014	1.043	−0.099	−0.764
	VNO3	2.796	1.092	−0.833	0.732
	VNO4	3.860	0.849	−0.940	1.322
	LOP1	3.133	1.086	−0. 41	−0.906
	IAP1	3.088	1.064	−0.177	−0.765
	IAP2	2.670	0.998	0.152	−0.479
	IAP3	3.317	1.024	−0.387	−0.722
	IAP5	2.495	1.095	−0.451	−0.486
Patient satisfaction	CHD1	3.256	1.101	−0.193	−1.058
	CHD3	3.246	1.125	−0.074	−1.096
	CHD4	3.378	1.154	−0.270	−0.989
	GSA1	3.003	1.070	0.136	−0.978
	GSA2	3.058	1.091	−0.018	−0.955
	GSA4	3.146	1.098	−0.044	−0.989
	GSA5	3.153	1.140	−0.132	−0.927
	GSA6	3.188	1.043	−0.118	−0.873